## REMARKS

This is a full and timely response to the final Office Action (Paper No. omitted) mailed by the U.S. Patent and Trademark Office on May 6, 2004. Claims 1, 3-8, 10-14 and 16-26 remain pending in the application. In view of the following remarks, reconsideration and allowance of the presently pending claims is respectfully requested.

Applicant respectfully submits that the pending claims are allowable over the cited references for at least the reason that the cited references do not disclose, teach, or suggest at least a multiple wavelength output light source, wherein a laser device and a plurality of modulators are fabricated on one substrate and comprise one module.

Each rejection presented in the Office Action is discussed in the remarks that follow.

### I. Response to 35 U.S.C. §103 Rejections

#### A. Statement of the Rejection

Claims 1, 3-4, 6-8, 10-11, 13 and 19-26 presently stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent No. 6,603,781 to Stinson *et al.* (hereafter *Stinson*) in view of U.S. Patent No. 6,429,955 to Suemura *et al.* (hereafter *Suemura*).

#### B. Discussion of the Rejection

Applicant respectfully traverses the rejection of claims 1, 3-4, 6-8, 10-11, 13 and 19-26 under 35 U.S.C. §103(a) over *Stinson* in view of *Suemura* for at least the reason that the proposed combination fails to disclose, teach, or suggest each element in the claims.

For a claim to be properly rejected under 35 U.S.C. §103, "[t]he PTO has the burden under section 103 to establish a *prima facie* case of obviousness. It can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references." *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988) (Citations omitted). Further, to establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re*

*Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). Further, "[t]he mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." *In re Fritch*, 972 F.2d 1260, 1266, 23 U.S.P.Q.2d 1780 (Fed Cir. 1992).

For at least the reason that the proposed combination fails to disclose, teach, or suggest at least Applicant's multiple wavelength output light source, "wherein the laser device, the plurality of modulators and the demultiplexer are fabricated on one substrate and comprise one module," as recited in claim 1, Applicant respectfully submits that *Stinson does not* anticipate Applicant's independent claim 1.

**Claim 1**

For convenience of analysis, independent claim 1 is repeated below in its entirety.

1. A multiple wavelength output light source, comprising:

a laser device having a plurality of output wavelengths;

a demultiplexer optically coupled to the laser device, the demultiplexer for separating the plurality of output wavelengths; and

a plurality of modulators optically coupled to the demultiplexer, the modulators associated with and configured to modulate each wavelength, ***wherein the laser device, the plurality of modulators and the demultiplexer are fabricated on one substrate and comprise one module.***

(Applicant's independent claim 1- *emphasis added.*)

Applicant respectfully asserts that the proposed combination fails to disclose, teach, or suggest at least the emphasized elements of pending claim 1 as shown above. Consequently, claim 1 is allowable.

Specifically, the proposed combination fails to disclose, teach, or suggest at least Applicant's multiple wavelength output light source comprising "a plurality of modulators optically coupled to the demultiplexer, the modulators associated with and configured to modulate each wavelength, ***wherein the laser device, the plurality of modulators and the demultiplexer are fabricated on one substrate and comprise one module.***"

*Stinson* appears to disclose an optical transmitter having a number of different functional elements coupled to provide optical modulation. *Stinson* merely discloses an optical transmitter having a number of distributed components.

*Suemura* appears to disclose an optical network having wavelength tunable optical transmitters, a MNxN optical switch whose input ports are connected to the respective wavelength tunable optical transmitters of number MN, and which allows optical signals input to different input ports to be output from the same output port. Indeed, Applicant has carefully reviewed the teachings of *Stinson* and *Suemura* and can find nothing to indicate the manner in which the components in *Stinson* or *Suemura* are assembled, much less any teaching that the elements are formed on a single substrate. Applicant respectfully requests that the Examiner point out the specific location in *Stinson* or *Suemura* where a single substrate implementation is disclosed.

In marked contrast to the proposed combination, the present invention discloses a multiple wavelength output light source comprising at least "a plurality of modulators optically coupled to the demultiplexer, the modulators associated with and configured to modulate each wavelength, ***wherein the laser device, the plurality of modulators and the demultiplexer are fabricated on one substrate and comprise one module.***" Applicant respectfully submits that at least these features are neither disclosed, taught or suggested by the proposed combination.

Applicant respectfully submits that the proposed combination fails to disclose, teach or suggest at least the elements in Applicant's claim 1 highlighted above. Therefore, while *Stinson* appears to disclose the implementation of an optical transmitter, and *Suemura* appears to disclose an optical network having a number of configurable implementations, the proposed combination fails to disclose, teach or suggest Applicant's multiple wavelength output light source including at least the elements highlighted above in claim 1.

In marked contrast to the proposed combination, the present invention discloses a multiple wavelength output light source comprising at least "a plurality of modulators optically coupled to the demultiplexer, the modulators associated with and configured to modulate each wavelength, ***wherein the laser device, the plurality of modulators and the demultiplexer are fabricated on one substrate and comprise one module.***" Specifically, on page 3, lines 14-16, the specification states that "the laser device, the plurality of modulators and the combining device can be economically fabricated on one substrate and comprise one module." Further, on page 9, lines 3-18, the specification states:

> FIG. 5 is a graphical illustration showing a light source 400 integrated in a single module. The module 400 includes a ceramic module 404 over which a silica waveguide combiner 406 is constructed. The silica waveguide combiner 406 may include the demultiplexer 218 and the multiplexer 252 of FIG. 3. The FP laser 210 receives an electrical input stimulus over connection 402 and can also be integrated onto the ceramic module 404 as shown so that the light output of the FP laser 210 is coupled to the silica waveguide combiner 406. The silica waveguide combiner 406, and more specifically, the demultiplexer 218 fabricated thereon, include the individual connections 222, 224, 226 and 228 that couple the output of the FP laser 210 to respective modulators 232, 234, 236 and 238. The output of each modulator is then supplied to a respective connection 242, 244, 246 and 248 over which the outputs are combined onto the optical fiber 104.
>
> As shown in FIG. 5, the laser 210, the demultiplexer 218, the modulators 232, 234, 236 and 238, and the multiplexer 252 can all be integrated onto the ceramic module 404, thus creating a compact modular light source that is capable of providing multiple wavelength output modulated light signals from the single FP laser.

With regard to the statement on page 3 of the Office Action that "[s]uemura teaches providing his device with a plurality of modulators and the demultiplexer are fabricated on one substrate and comprise one module with a multiple wavelength output light source for the purpose of to produce a structure that is compact, inexpensive, and has readily controlled tolerances," Applicant respectfully submits that nowhere does *Suemura* disclose, teach or suggest a plurality of modulators and a demultiplexer fabricated on one substrate that comprise one module with a multiple wavelength output light source. Applicant respectfully submits that, while *Suemura* appears to mention in col. 13, ll. 52-55 that the "optical wavelength demultiplexer 3 is an arrayed waveguide grating type optical wavelength demultiplexer composed of silica waveguides fabricated on a silicon substrate," nowhere does the proposed combination disclose, teach or suggest Applicant's device including at least "a plurality of modulators optically coupled to the demultiplexer, the modulators associated with and configured to modulate each wavelength, ***wherein the laser device, the plurality of modulators and the demultiplexer are fabricated on one substrate and comprise one module***."

Applicant further respectfully submits that, while *Suemura* appears to mention in col. 9, ll. 10-17 that "[t]he optical network of this embodiment, as shown in FIG. 7, can be modularized into a transmit module 60 composed of four wavelength tunable optical transmitters 1 and 4x4 optical switch 13, and a receive module 61 composed of the optical

combiner 14, optical wavelength demultiplexer 3 and four optical receivers 4," nowhere does the proposed combination disclose, teach or suggest Applicant's device including at least "a plurality of modulators optically coupled to the demultiplexer, the modulators associated with and configured to modulate each wavelength, ***wherein the laser device, the plurality of modulators and the demultiplexer are fabricated on one substrate and comprise one module.***"

Further, Applicant respectfully disagrees with the statement on page 3 of the Office Action that:

> [i]t would have been obvious at the time of applicant's invention, to combine Suemura of teaching a plurality of modulators and the demultiplexer are fabricated on one substrate and comprise one module with a multiple wavelength output light source because as the multi/demultiplexer, a device using PLCs (Planar Lightwave Circuits) consisting of optical waveguides formed on a substrate has been developed as the most realistic device from the point of view of a small size, a light weight, and a high reliability. Of these PLCs, a silica-based PLC fabricated by depositing a silica glass film on a silicon substrate is expected as a practical optical component, since it has a small optical loss and consequently a high stability against disturbance such as heat or vibrations. The entire multiplexer, and the entire demultiplexer, could be fabricated on a single substrate, to produce a structure that is compact, inexpensive, and has readily controlled tolerances.

Applicant respectfully submits that nowhere does *Suemura* disclose, teach or suggest "a plurality of modulators optically coupled to the demultiplexer, the modulators associated with and configured to modulate each wavelength, ***wherein the laser device, the plurality of modulators and the demultiplexer are fabricated on one substrate and comprise one module,***" as recited in independent claim 1. Nor does the proposed combination disclose, teach or suggest the implementation of a planar lightwave circuit as alleged in the Office Action. Indeed, the Office Action's mere independent assertion that a planar lightwave circuit consists of "optical waveguides formed on a substrate," and the assertion that "optical waveguides formed on a substrate has been developed as the most realistic device from the point of view of a small size, a light weight, and a high reliability," fails to specifically point out where the proposed combination discloses at least Applicant's "plurality of modulators optically coupled to the demultiplexer, the modulators associated with and configured to modulate each wavelength, ***wherein the laser device, the plurality of modulators and the demultiplexer are fabricated on one substrate and comprise one module.***"

Applicant also respectfully submits that the mere conjecture in the Office Action that "[t]he entire multiplexer, and the entire demultiplexer, could be fabricated on a single substrate," fails to specifically identify the location in the proposed combination that discloses at least Applicant's "plurality of modulators optically coupled to the demultiplexer, the modulators associated with and configured to modulate each wavelength, ***wherein the laser device, the plurality of modulators and the demultiplexer are fabricated on one substrate and comprise one module.***"

Thus, the proposed combination fails to disclose, teach, or suggest each element of Applicant's independent claim 1. Consequently, Applicant respectfully submits that claim 1 is allowable over the proposed combination and requests that the rejection of claim 1 be withdrawn.

Because independent claim 1 is allowable, dependent claims 3-7, which depend directly from allowable independent claim 1 are also allowable. *In re Fine,* 837 F.2d 1071 (Fed. Cir. 1988). Accordingly, Applicant respectfully requests that the rejection of claims 1 and 3-7 be withdrawn.

**Claim 8**

For convenience of analysis, independent claim 8 is repeated below in its entirety.

8. A method for forming a broad spectrum modulated laser output, the method comprising:

providing a laser device having a plurality of output wavelengths;

separating the plurality of output wavelengths;

modulating each of the plurality of output wavelengths; and

***forming the laser device and performing the modulating step and the separating step on one substrate.***

(Applicant's independent claim 8 - *emphasis added.*)

Applicant respectfully asserts that the proposed combination fails to disclose, teach, or suggest at least the emphasized elements of pending claim 8 as shown above. Consequently, claim 8 is allowable.

Specifically, the proposed combination fails to disclose, teach, or suggest at least Applicant's method for forming a broad spectrum modulated laser output comprising

"***forming the laser device and performing the modulating step and the separating step on one substrate***."

*Stinson* appears to disclose an optical transmitter having a number of different functional elements coupled to provide optical modulation. *Stinson* merely discloses an optical transmitter having a number of distributed components.

*Suemura* appears to disclose an optical network having wavelength tunable optical transmitters, a MNxN optical switch whose input ports are connected to the respective wavelength tunable optical transmitters of number MN, and which allows optical signals input to different input ports to be output from the same output port. Indeed, Applicant has carefully reviewed the teachings of *Stinson* and *Suemura* and can find nothing to indicate the manner in which the components in *Stinson* or *Suemura* are assembled, much less any teaching that the elements are formed on a single substrate. Applicant respectfully requests that the Examiner point out the specific location in *Stinson* or *Suemura* where a single substrate implementation is disclosed.

In marked contrast to the proposed combination, the present invention discloses a method for forming a broad spectrum modulated laser output comprising at least "***forming the laser device and performing the modulating step and the separating step on one substrate.***" Applicant respectfully submits that at least this feature is neither disclosed, taught or suggested by the proposed combination.

Applicant respectfully submits that the proposed combination fails to disclose, teach or suggest at least the elements in Applicant's claim 8 highlighted above. Therefore, while *Stinson* appears to disclose the implementation of an optical transmitter, and *Suemura* appears to disclose an optical network having a number of configurable implementations, the proposed combination fails to disclose, teach or suggest Applicant's method for forming a broad spectrum modulated laser output including at least the step highlighted above in claim 8.

In marked contrast to the proposed combination, the present invention discloses a method for forming a broad spectrum modulated laser output comprising at least "***forming the laser device and performing the modulating step and the separating step on one substrate***."

With regard to the statement on page 5 of the Office Action that "[s]uemura teaches providing his device with a forming the laser device and performing the modulating step and the separating step on a single module for the purpose of to produce a structure that is

compact, inexpensive, and has readily controlled tolerances," Applicant respectfully submits that nowhere does *Suemura* disclose, teach or suggest a plurality of modulators and a demultiplexer fabricated on one substrate that comprise one module with a multiple wavelength output light source. Applicant respectfully submits that, while *Suemura* appears to mention in col. 13, ll. 52-55 that the "optical wavelength demultiplexer 3 is an arrayed waveguide grating type optical wavelength demultiplexer composed of silica waveguides fabricated on a silicon substrate," nowhere does the proposed combination disclose, teach or suggest Applicant's method for forming a broad spectrum modulated laser output comprising at least "***forming the laser device and performing the modulating step and the separating step on one substrate***."

Applicant further respectfully submits that, while *Suemura* appears to mention in col. 9, ll. 10-17 that "[t]he optical network of this embodiment, as shown in FIG. 7, can be modularized into a transmit module 60 composed of four wavelength tunable optical transmitters 1 and 4x4 optical switch 13, and a receive module 61 composed of the optical combiner 14, optical wavelength demultiplexer 3 and four optical receivers 4," nowhere does the proposed combination disclose, teach or suggest Applicant's method for forming a broad spectrum modulated laser output comprising at least "***forming the laser device and performing the modulating step and the separating step on one substrate***."

Further, Applicant respectfully disagrees with the statement on page 6 of the Office Action that:

> [i]t would have been obvious at the time of applicant's invention, to combine Suemura of teaching a forming the laser device and performing the modulating step and the separating step on a single module with a multiple wavelength output light source because as the multi/demultiplexer, a device using PLCs (Planar Lightwave Circuits) consisting of optical waveguides formed on a substrate has been developed as the most realistic device from the point of view of a small size, a light weight, and a high reliability. Of these PLCs, a silica-based PLC fabricated by depositing a silica glass film on a silicon substrate is expected as a practical optical component, since it has a small optical loss and consequently a high stability against disturbance such as heat or vibrations. The entire multiplexer, and the entire demultiplexer, could be fabricated on a single substrate, to produce a structure that is compact, inexpensive, and has readily controlled tolerances.

Applicant respectfully submits that nowhere does *Suemura* disclose, teach or suggest Applicant's method for forming a broad spectrum modulated laser output comprising at least "***forming the laser device and performing the modulating step and the separating step on one substrate***," as recited in independent claim 8. Nor does the proposed combination disclose, teach or suggest the implementation of a planar lightwave circuit as alleged in the Office Action. Indeed, the Office Action's mere independent assertion that a planar lightwave circuit consists of "optical waveguides formed on a substrate," and the assertion that "optical waveguides formed on a substrate has been developed as the most realistic device from the point of view of a small size, a light weight, and a high reliability," fails to specifically point out where the proposed combination discloses at least Applicant's "method for forming a broad spectrum modulated laser output comprising at least "***forming the laser device and performing the modulating step and the separating step on one substrate***."

Applicant also respectfully submits that the mere conjecture in the Office Action that "[t]he entire multiplexer, and the entire demultiplexer, could be fabricated on a single substrate," fails to specifically identify the location in the proposed combination that discloses at least Applicant's "method for forming a broad spectrum modulated laser output comprising at least "***forming the laser device and performing the modulating step and the separating step on one substrate***."

Thus, the proposed combination fails to disclose, teach, or suggest each element of Applicant's independent claim 8. Consequently, Applicant respectfully submits that claim 8 is allowable over the proposed combination and requests that the rejection of claim 8 be withdrawn.

Because independent claim 8 is allowable, dependent claims 10, 11 and 13, which depend directly from allowable independent claim 8 are also allowable. *In re Fine, supra.* Accordingly, Applicant respectfully requests that the rejection of claims 8, 10, 11 and 13 be withdrawn.

**Claim 19**

For convenience of analysis, independent claim 19 is repeated below in its entirety.

19. An optical system comprising:

a laser that outputs plural wavelengths; and

modulator means optically coupled to the laser, the modulator means for modulating each of the wavelengths independently, ***wherein the laser and the modulator means are fabricated on one substrate and comprise one module.***

(Applicant's independent claim 19 - *emphasis added.*)

Applicant respectfully asserts that the proposed combination fails to disclose, teach, or suggest at least the emphasized elements of pending claim 19 as shown above. Consequently, claim 19 is allowable.

Specifically, the proposed combination fails to disclose, teach, or suggest at least Applicant's optical system comprising "modulator means optically coupled to the laser, the modulator means for modulating each of the wavelengths independently, ***wherein the laser and the modulator means are fabricated on one substrate and comprise one module.***"

*Stinson* appears to disclose an optical transmitter having a number of different functional elements coupled to provide optical modulation. *Stinson* merely discloses an optical transmitter having a number of distributed components.

*Suemura* appears to disclose an optical network having wavelength tunable optical transmitters, a MNxN optical switch whose input ports are connected to the respective wavelength tunable optical transmitters of number MN, and which allows optical signals input to different input ports to be output from the same output port. Indeed, Applicant has carefully reviewed the teachings of *Stinson* and *Suemura* and can find nothing to indicate the manner in which the components in *Stinson* or *Suemura* are assembled, much less any teaching that the elements are formed on a single substrate. Applicant respectfully requests that the Examiner point out the specific location in *Stinson* or *Suemura* where a single substrate implementation is disclosed.

In marked contrast to the proposed combination, the present invention discloses an optical system comprising at least "modulator means optically coupled to the laser, the modulator means for modulating each of the wavelengths independently, ***wherein the laser and the modulator means are fabricated on one substrate and comprise one module.***" Applicant respectfully submits that at least these features are neither disclosed taught or suggested by the proposed combination.

Applicant respectfully submits that the proposed combination fails to disclose, teach or suggest at least the elements in Applicant's claim 19 highlighted above. Therefore, while *Stinson* appears to disclose the implementation of an optical transmitter, and *Suemura* appears to disclose an optical network having a number of configurable implementations, the proposed combination fails to disclose, teach or suggest Applicant's optical system including at least the elements highlighted above in claim 19.

In marked contrast to the proposed combination, the present invention discloses an optical system comprising at least "modulator means optically coupled to the laser, the modulator means for modulating each of the wavelengths independently, ***wherein the laser and the modulator means are fabricated on one substrate and comprise one module.***"

With regard to the statement on page 7 of the Office Action that "[s]uemura teaches providing his device with the laser and the modulator means are fabricated on one substrate and comprise one module with a multiple wavelength output light source for the purpose of to produce a structure that is compact, inexpensive, and has readily controlled tolerances," Applicant respectfully submits that nowhere does *Suemura* disclose, teach or suggest a laser and modulator means fabricated on one substrate that comprise one module with a multiple wavelength output light source. Applicant respectfully submits that, while *Suemura* appears to mention in col. 13, ll. 52-55 that the "optical wavelength demultiplexer 3 is an arrayed waveguide grating type optical wavelength demultiplexer composed of silica waveguides fabricated on a silicon substrate," nowhere does the proposed combination disclose, teach or suggest Applicant's optical system including at least "modulator means optically coupled to the laser, the modulator means for modulating each of the wavelengths independently, ***wherein the laser and the modulator means are fabricated on one substrate and comprise one module.***"

Applicant further respectfully submits that, while *Suemura* appears to mention in col. 9, ll. 10-17 that "[t]he optical network of this embodiment, as shown in FIG. 7, can be modularized into a transmit module 60 composed of four wavelength tunable optical transmitters 1 and 4x4 optical switch 13, and a receive module 61 composed of the optical combiner 14, optical wavelength demultiplexer 3 and four optical receivers 4," nowhere does the proposed combination disclose, teach or suggest Applicant's optical system including at least "modulator means optically coupled to the laser, the modulator means for modulating each of the wavelengths independently, ***wherein the laser and the modulator means are fabricated on one substrate and comprise one module.***"

Further, Applicant respectfully disagrees with the statement on page 8 of the Office Action that:

> [i]t would have been obvious at the time of applicant's invention, to combine Suemura of teaching a laser and the modulator means are fabricated on one substrate and comprise one module with a multiple wavelength output light source because as the multi/demultiplexer, a device using PLCs (Planar Lightwave Circuits) consisting of optical waveguides formed on a substrate has been developed as the most realistic device from the point of view of a small size, a light weight, and a high reliability. Of these PLCs, a silica-based PLC fabricated by depositing a silica glass film on a silicon substrate is expected as a practical optical component, since it has a small optical loss and consequently a high stability against disturbance such as heat or vibrations. The entire multiplexer, and the entire demultiplexer, could be fabricated on a single substrate, to produce a structure that is compact, inexpensive, and has readily controlled tolerances.

Applicant respectfully submits that nowhere does *Suemura* disclose, teach or suggest "modulator means optically coupled to the laser, the modulator means for modulating each of the wavelengths independently, ***wherein the laser and the modulator means are fabricated on one substrate and comprise one module***," as recited in independent claim 19. Nor does the proposed combination disclose, teach or suggest the implementation of a planar lightwave circuit as alleged in the Office Action. Indeed, the Office Action's mere independent assertion that a planar lightwave circuit consists of "optical waveguides formed on a substrate," and the assertion that "optical waveguides formed on a substrate has been developed as the most realistic device from the point of view of a small size, a light weight, and a high reliability," fails to specifically point out where the proposed combination discloses at least Applicant's "modulator means optically coupled to the laser, the modulator means for modulating each of the wavelengths independently, ***wherein the laser and the modulator means are fabricated on one substrate and comprise one module.***"

Applicant also respectfully submits that the mere conjecture in the Office Action that "[t]he entire multiplexer, and the entire demultiplexer, could be fabricated on a single substrate," fails to specifically identify the location in the proposed combination that discloses at least Applicant's "modulator means optically coupled to the laser, the modulator means for modulating each of the wavelengths independently, ***wherein the laser and the modulator means are fabricated on one substrate and comprise one module.***"

Thus, the proposed combination fails to disclose, teach, or suggest each element of Applicant's independent claim 19. Consequently, Applicant respectfully submits that claim 19 is allowable over the proposed combination and requests that the rejection of claim 19 be withdrawn.

Because independent claim 19 is allowable, dependent claims 20-22, which depend directly from allowable independent claim 19 are also allowable. *In re Fine, supra.* Accordingly, Applicant respectfully requests that the rejection of claims 19-22 be withdrawn.

**Claim 23**

For convenience of analysis, independent claim 23, as amended, is repeated below in its entirety.

> 23. An optical method comprising:
> operating a laser to provide an output characterized by plural wavelengths;
> modulating the plural wavelengths independently; and
> ***forming the laser device and performing the modulating step on one substrate.***

(Applicant's independent claim 23 - *emphasis added.*)

Applicant respectfully asserts that the proposed combination fails to disclose, teach, or suggest at least the emphasized elements of pending claim 23 as shown above. Consequently, claim 23 is allowable.

Specifically, the proposed combination fails to disclose, teach, or suggest at least Applicant's optical method comprising "***forming the laser device and performing the modulating step on one substrate.***"

*Stinson* appears to disclose an optical transmitter having a number of different functional elements coupled to provide optical modulation. *Stinson* merely discloses an optical transmitter having a number of distributed components.

*Suemura* appears to disclose an optical network having wavelength tunable optical transmitters, a MNxN optical switch whose input ports are connected to the respective wavelength tunable optical transmitters of number MN, and which allows optical signals input to different input ports to be output from the same output port. Indeed, Applicant has carefully reviewed the teachings of *Stinson* and *Suemura* and can find nothing to indicate the

manner in which the components in *Stinson* or *Suemura* are assembled, much less any teaching that the elements are formed on a single substrate. Applicant respectfully requests that the Examiner point out the specific location in *Stinson* or *Suemura* where a single substrate implementation is disclosed.

In marked contrast to the proposed combination, the present invention discloses an optical method comprising at least "***forming the laser device and performing the modulating step on one substrate.***" Applicant respectfully submits that at least this feature is neither disclosed, taught or suggested by the proposed combination.

Applicant respectfully submits that the proposed combination fails to disclose, teach or suggest at least the elements in Applicant's claim 23 highlighted above. Therefore, while *Stinson* appears to disclose the implementation of an optical transmitter, and *Suemura* appears to disclose an optical network having a number of configurable implementations, the proposed combination fails to disclose, teach or suggest Applicant's optical method including at least the step highlighted above in Claim 23.

In marked contrast to the proposed combination, the present invention discloses an optical method for comprising at least "***forming the laser device and performing the modulating step on one substrate.***"

With regard to the statement on page 9 of the Office Action that "[s]uemura teaches providing his device with forming the laser device and performing the modulating step on one substrate with a multiple wavelength output light source for the purpose of to produce a structure that is compact, inexpensive, and has readily controlled tolerances," Applicant respectfully submits that nowhere does *Suemura* disclose, teach or suggest forming a laser device and performing a modulating step on one substrate. Applicant respectfully submits that, while *Suemura* appears to mention in col. 13, ll. 52-55 that the "optical wavelength demultiplexer 3 is an arrayed waveguide grating type optical wavelength demultiplexer composed of silica waveguides fabricated on a silicon substrate," nowhere does the proposed combination disclose, teach or suggest Applicant's optical method comprising at least "***forming the laser device and performing the modulating step on one substrate.***"

Applicant further respectfully submits that, while *Suemura* appears to mention in col. 9, ll. 10-17 that "[t]he optical network of this embodiment, as shown in FIG. 7, can be modularized into a transmit module 60 composed of four wavelength tunable optical transmitters 1 and 4x4 optical switch 13, and a receive module 61 composed of the optical combiner 14, optical wavelength demultiplexer 3 and four optical receivers 4," nowhere does

the proposed combination disclose, teach or suggest Applicant's optical method comprising at least "***forming the laser device and performing the modulating step on one substrate***."

Further, Applicant respectfully disagrees with the statement on page 10 of the Office Action that:

> [i]t would have been obvious at the time of applicant's invention, to combine Suemura of teaching forming the laser device and performing the modulating step on one substrate with a multiple wavelength output light source because as the multi/demultiplexer, a device using PLCs (Planar Lightwave Circuits) consisting of optical waveguides formed on a substrate has been developed as the most realistic device from the point of view of a small size, a light weight, and a high reliability. Of these PLCs, a silica-based PLC fabricated by depositing a silica glass film on a silicon substrate is expected as a practical optical component, since it has a small optical loss and consequently a high stability against disturbance such as heat or vibrations. The entire multiplexer, and the entire demultiplexer, could be fabricated on a single substrate, to produce a structure that is compact, inexpensive, and has readily controlled tolerances.

Applicant respectfully submits that nowhere does *Suemura* disclose, teach or suggest Applicant's optical method comprising at least "***forming the laser device and performing the modulating step on one substrate***," as recited in independent claim 23. Nor does the proposed combination disclose, teach or suggest the implementation of a planar lightwave circuit as alleged in the Office Action. Indeed, the Office Action's mere independent assertion that a planar lightwave circuit consists of "optical waveguides formed on a substrate," and the assertion that "optical waveguides formed on a substrate has been developed as the most realistic device from the point of view of a small size, a light weight, and a high reliability," fails to specifically point out where the proposed combination discloses at least Applicant's optical method comprising at least "***forming the laser device and performing the modulating step on one substrate***."

Applicant also respectfully submits that the mere conjecture in the Office Action that "[t]he entire multiplexer, and the entire demultiplexer, could be fabricated on a single substrate," fails to specifically identify the location in the proposed combination that discloses at least Applicant's optical method comprising at least "***forming the laser device and performing the modulating step on one substrate***."

Thus, the proposed combination fails to disclose, teach, or suggest each element of Applicant's independent claim 23. Consequently, Applicant respectfully submits that claim 23

is allowable over the proposed combination and requests that the rejection of claim 23 be withdrawn.

Because independent claim 23 is allowable, dependent claims 24-26, which depend directly from allowable independent claim 23 are also allowable. *In re Fine, supra.* Accordingly, Applicant respectfully requests that the rejection of claims 23-26 be withdrawn.

## II. Response to 35 U.S.C. §103 Rejections

### A. Statement of the Rejection

Claims 5, 12 and 15-18 presently stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over *Stinson* in view of *Suemura* and further in view of U.S. Patent No. 6,570,703 to Murakami *et al.* (hereafter *Murakami*).

Applicant respectfully submits that claim 15 was canceled in the prior response, filed on January 27, 2004, and that independent claim 14 is not indicated as being rejected in the paragraph at the top of page 12 of the Office Action. However, the specific rejection of independent claim 14 appears on pages 12 and 13 below the paragraph in which claims 5, 12 and 15-18 are rejected over the combination of *Stinson*, *Suemura* and *Murakami*. However, *Murakami* is not mentioned on pages 12-13 in the specific rejection of claim 14. Accordingly, Applicant will respond to the specific rejection of claim 14 on pages 12-13 of the Office Action. If Applicant has misunderstood the intent of the Office Action, Applicant requests clarification in a subsequent action.

### B. Discussion of the Rejection

Applicant respectfully traverses the rejection of claims 5, 12, 14 and 16-18 under 35 U.S.C. §103(a) over *Stinson* in view of *Suemura* and further in view of *Murakami* because independent claim 14 includes features that are neither disclosed, taught nor suggested by the proposed combination, and for at least the reason that dependent claims 5, 12 and 17-18 depend from allowable independent claims. *In re Fine, supra.*

**Claim 14**

For convenience of analysis, independent claim 14 is repeated below in its entirety.

14. A method for forming a broad spectrum modulated laser output, the method comprising the steps of:

providing a Fabry-Perot laser device having a plurality of outputs, each output at a different spectral location;

separating the plurality of outputs;

modulating each of the plurality of outputs with communication information resulting in a plurality of modulated outputs; and

***forming the Fabry-Perot laser device and performing the modulating step and the separating step on one substrate.***

(Applicant's independent claim 14 - *emphasis added.*)

Applicant respectfully asserts that the proposed combination fails to disclose, teach, or suggest at least the emphasized elements of pending claim 14 as shown above. Consequently, claim 14 is allowable.

Specifically, the proposed combination fails to disclose, teach, or suggest at least Applicant's method for forming a broad spectrum modulated laser output comprising "***forming the Fabry-Perot laser device and performing the modulating step and the separating step on one substrate.***"

*Stinson* appears to disclose an optical transmitter having a number of different functional elements coupled to provide optical modulation. *Stinson* merely discloses an optical transmitter having a number of distributed components.

*Suemura* appears to disclose an optical network having wavelength tunable optical transmitters, a MNxN optical switch whose input ports are connected to the respective wavelength tunable optical transmitters of number MN, and which allows optical signals input to different input ports to be output from the same output port. Indeed, Applicant has carefully reviewed the teachings of *Stinson* and *Suemura* and can find nothing to indicate the manner in which the components in *Stinson* or *Suemura* are assembled, much less any teaching that the elements are formed on a single substrate. Applicant respectfully requests that the Examiner point out the specific location in *Stinson* or *Suemura* where a single substrate implementation is disclosed.

In marked contrast to the proposed combination, the present invention discloses a method for forming a broad spectrum modulated laser output comprising at least "***forming***

***the Fabry-Perot laser device and performing the modulating step and the separating step on one substrate.***" Applicant respectfully submits that at least this feature is neither disclosed, taught or suggested by the proposed combination.

Applicant respectfully submits that the proposed combination fails to disclose, teach or suggest at least the elements in Applicant's claim 14 highlighted above. Therefore, while *Stinson* appears to disclose the implementation of an optical transmitter, and *Suemura* appears to disclose an optical network having a number of configurable implementations, the proposed combination fails to disclose, teach or suggest Applicant's method for forming a broad spectrum modulated laser output including at least the step highlighted above in claim 14.

In marked contrast to the proposed combination, the present invention discloses a method for forming a broad spectrum modulated laser output comprising at least "***forming the Fabry-Perot laser device and performing the modulating step and the separating step on one substrate.***"

With regard to the statement on page 13 of the Office Action that "[s]uemura teaches providing his device with forming the Fabry-Perot laser device and performing the modulating step and the separating step on one substrate with a multiple wavelength output light source for the purpose of to produce a structure that is compact, inexpensive, and has readily controlled tolerances," Applicant respectfully submits that nowhere does *Suemura* disclose, teach or suggest forming a Fabry-Perot laser device and performing the modulating step and the separating step on one substrate. Applicant respectfully submits that, while *Suemura* appears to mention in col. 13, ll. 52-55 that the "optical wavelength demultiplexer 3 is an arrayed waveguide grating type optical wavelength demultiplexer composed of silica waveguides fabricated on a silicon substrate," nowhere does the proposed combination disclose, teach or suggest Applicant's method for forming a broad spectrum modulated laser output comprising at least "***forming the Fabry-Perot laser device and performing the modulating step and the separating step on one substrate.***"

Applicant further respectfully submits that, while *Suemura* appears to mention in col. 9, ll. 10-17 that "[t]he optical network of this embodiment, as shown in FIG. 7, can be modularized into a transmit module 60 composed of four wavelength tunable optical transmitters 1 and 4x4 optical switch 13, and a receive module 61 composed of the optical combiner 14, optical wavelength demultiplexer 3 and four optical receivers 4," nowhere does the proposed combination disclose, teach or suggest Applicant's method for forming a broad

spectrum modulated laser output comprising at least "***forming the Fabry-Perot laser device and performing the modulating step and the separating step on one substrate***."

Further, Applicant respectfully disagrees with the statement on page 13 of the Office Action that:

> [i]t would have been obvious at the time of applicant's invention, to combine Suemura of teaching a forming the Fabry-Perot laser device and performing the modulating step and the separating step on one substrate with a multiple wavelength output light source because as the multi/demultiplexer, a device using PLCs (Planar Lightwave Circuits) consisting of optical waveguides formed on a substrate has been developed as the most realistic device from the point of view of a small size, a light weight, and a high reliability. Of these PLCs, a silica-based PLC fabricated by depositing a silica glass film on a silicon substrate is expected as a practical optical component, since it has a small optical loss and consequently a high stability against disturbance such as heat or vibrations. The entire multiplexer, and the entire demultiplexer, could be fabricated on a single substrate, to produce a structure that is compact, inexpensive, and has readily controlled tolerances.

Applicant respectfully submits that nowhere does *Suemura* disclose, teach or suggest Applicant's method for forming a broad spectrum modulated laser output comprising at least "***forming the Fabry-Perot laser device and performing the modulating step and the separating step on one substrate***," as recited in independent claim 14. Nor does the proposed combination disclose, teach or suggest the implementation of a planar lightwave circuit as alleged in the Office Action. Indeed, the Office Action's mere independent assertion that a planar lightwave circuit consists of "optical waveguides formed on a substrate," and the assertion that "optical waveguides formed on a substrate has been developed as the most realistic device from the point of view of a small size, a light weight, and a high reliability," fails to specifically point out where the proposed combination discloses at least Applicant's "method for forming a broad spectrum modulated laser output comprising at least "***forming the Fabry-Perot laser device and performing the modulating step and the separating step on one substrate***."

Applicant also respectfully submits that the mere conjecture in the Office Action that "[t]he entire multiplexer, and the entire demultiplexer, could be fabricated on a single substrate," fails to specifically identify the location in the proposed combination that discloses at least Applicant's "method for forming a broad spectrum modulated laser output comprising

at least "***forming the Fabry-Perot laser device and performing the modulating step and the separating step on one substrate***."

Thus, the proposed combination fails to disclose, teach, or suggest each element of Applicant's independent claim 14. Consequently, Applicant respectfully submits that claim 14 is allowable over the proposed combination and requests that the rejection of claim 14 be withdrawn.

Because independent claim 14 is allowable, dependent claims 16-18, which depend directly from allowable independent claim 14 are also allowable. Further, dependent claims 5 and 12 are allowable for at least the reason that they depend from allowable independent claims. *In re Fine, supra*. Accordingly, Applicant respectfully requests that the rejection of claims 5, 12, 14 and 16-18 be withdrawn.

## III. No Motivation to Combine *Stinson* with *Suemura*

Applicant respectfully submits that there is no motivation to combine *Stinson* with *Suemura* to arrive at the present invention. "Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. Under section 103, teachings of references can be combined only if there is some suggestion or incentive to do so." *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). Further, "[t]here must be some reason, suggestion, or motivation found in the prior art whereby a person of ordinary skill in the field of the invention would make the combination." *In re Oetiker*, 977 F.2d 1443, 1447, 24 USPQ2d 1443 (Fed. Cir. 1992).

Applicant respectfully submits that there is nothing in *Stinson* or *Suemura* that would motivate one having ordinary skill in the art to combine these references to arrive at Applicant's invention. Further, the proposed combination fails to provide either a reasonable expectation of success of combining the references to achieve the single substrate, single module architecture of the invention, or show any relevance to the problem solved by Applicant's invention. Further, the Office Action fails to articulate a clear motivation to make the proposed combination.

Specifically, Applicant respectfully submits that the Office Action fails to establish a prima facie case of obviousness because the Office Action has not pointed out the specific teachings in *Stinson* and *Suemura* that would motivate one having ordinary skill in the art to

combine the references to arrive at Applicant's invention. Indeed, the proposed combination of *Stinson* and *Suemura* fails to disclose, teach or suggest at least Applicant's "***forming the laser device and performing the modulating step on one substrate***."

Further, Applicant respectfully disagrees with the conclusory statement in the Office Action that:

> [i]t would have been obvious at the time of applicant's invention, to combine Suemura of teaching a plurality of modulators and the demultiplexer are fabricated on one substrate and comprise one module with a multiple wavelength output light source because as the multi/demultiplexer, a device using PLCs (Planar Lightwave Circuits) consisting of optical waveguides formed on a substrate has been developed as the most realistic device from the point of view of a small size, a light weight, and a high reliability. Of these PLCs, a silica-based PLC fabricated by depositing a silica glass film on a silicon substrate is expected as a practical optical component, since it has a small optical loss and consequently a high stability against disturbance such as heat or vibrations. The entire multiplexer, and the entire demultiplexer, could be fabricated on a single substrate, to produce a structure that is compact, inexpensive, and has readily controlled tolerances.

Applicant respectfully submits that one having ordinary skill in the art would ***not*** be led toward combining *Stinson* and *Suemura* because, contrary to what the Office Action alleges, there is no suggestion in either reference to form the laser and the modulators on a single substrate. The Office Action merely alleges that "[t]he entire multiplexer, and the entire demultiplexer, could be fabricated on a single substrate, to produce a structure that is compact, inexpensive, and has readily controlled tolerances." However, the mere allegation in the Office Action that the multiplexer and the demultiplexer ***could be*** fabricated on a single substrate fails to show the specific location in either *Stinson* or *Suemura* where this is suggested. (Emphasis added).

Accordingly, Applicant respectfully submits that one having ordinary skill in the art would not be lead to combine the references because the proposed combination makes no suggestion to do so.

Accordingly, Applicant respectfully submits that independent claims 1, 8, 14, 19 and 23 are allowable over the proposed combination at least because the proposed combination is improper.

## CONCLUSION

In summary, Applicant respectfully requests that all outstanding claim rejections be withdrawn. Applicant respectfully submits that presently pending claims 1, 3-8, 10-14 and 16-26 are allowable over the cited art and the present application is in condition for allowance. Accordingly, a Notice of Allowance is respectfully solicited. Should the Examiner have any comment regarding the Applicant's response or believe that a teleconference would expedite prosecution of the pending claims, Applicant requests that the Examiner telephone Applicant's undersigned attorney.

Respectfully submitted,

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